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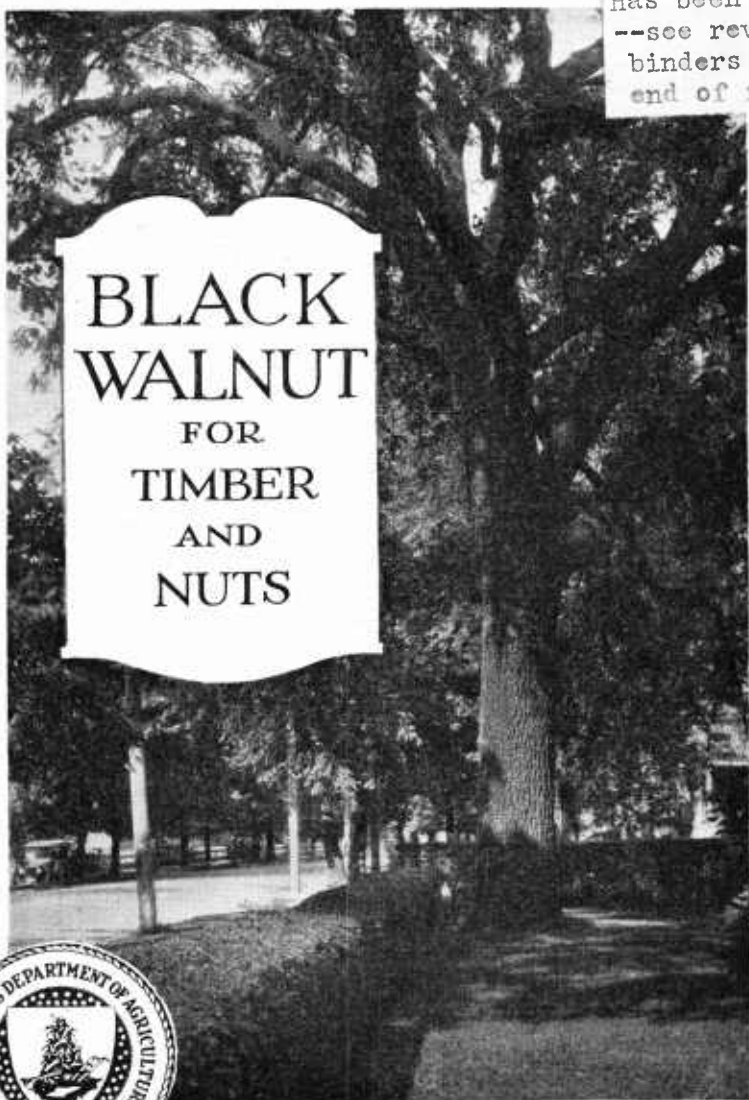
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U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1392

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BLACK WALNUT FOR TIMBER AND NUTS



Why Trees Should be Planted on the Farm:

They enhance its value.

Beautify it.

Provide shade and protection to stock, crops, and the farmstead.

Utilize lands where other crops are not wanted, rough, odd-shaped, or out-of-the-way places, steep or gullying lands.

Why Black Walnut Should be Selected for Planting:

It is easily started.

Grows at a fair rate.

Attains large size and long life.

Does not prevent grazing.

Yields edible nuts.

Produces useful and valuable timber.

Black walnut should be planted in agricultural soils well provided with moisture and well drained. Because of the good grade of soil and length of time required to produce valuable timber in forest stands, the planting of black walnut on a large scale by individual farmers is not recommended. Black walnut may be grown profitably for timber and nuts as individual trees, or in small groups on good land that is not valuable for other purposes.

The illustration on the title-page shows the large size, handsome development, and long life of black walnut grown under favorable conditions. The beauty and value of this tree are commonly not fully appreciated.

Washington, D. C.

August, 1924

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BLACK WALNUT FOR TIMBER AND NUTS

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INTRODUCTION.

The black walnut (*Juglans nigra* L.) is one of our most valuable native forest trees. Its timber has a wide field of usefulness; the nuts furnish a food product the economic possibilities of which are now becoming more generally recognized; and, under favorable conditions, the trees are highly effective for ornamental use. The botanical range of black walnut covers most of the eastern half of the United States.

The superiority of the wood of black walnut, also known commercially as "American" walnut—in color, texture, strength, ease of working, and resistance to destructive fungi and insect pests—early made it a favorite with American settlers. In the selection of material for buildings, fences, furniture, and interior decoration black walnut was chosen in preference to most other woods.

For making gunstocks and airplane propellers the wood is very well adapted and has been widely used in this and foreign countries. During the World War it was utilized exclusively for these purposes.

Because of the important service which the wood rendered during the war, and its high economic value in general, the black walnut tree has been planted in many places as a memorial tree in honor of men who gave their lives in the great conflict. During recent years it has been used to an increasing extent as an ornamental tree in yards and along roadsides. Perhaps the greatest single factor for stimulating walnut planting in the future is the discovery and propagation

by nurserymen of superior nut-bearing varieties, which already have become available in limited numbers for dooryard, garden, and orchard planting.

Several years ago the popular interest in growing black walnut centered on the production and profit from trees grown in close plantations, and most of the growth figures previously published were derived from the measurement of such stands. From both the timber-growing and financial standpoints, the results were discouraging in nearly all cases. With the change in the market demand to include wide-ringed walnut wood, which is capable of being finished

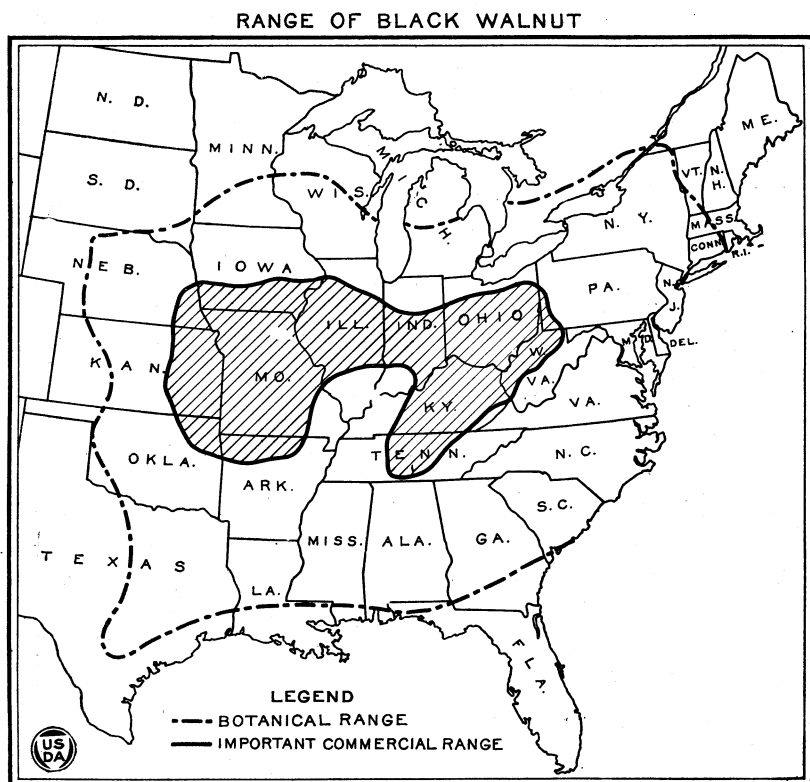


FIG. 1.—Botanical and important commercial ranges of the black walnut.

with an attractive figured grain, the aim in planting and growing walnut timber has changed largely to that of securing the most rapid growth of the individual tree. This is attained, as shown elsewhere, by the wide spacing of trees and growing them mostly in small groups or singly as individual trees. This arrangement, furthermore, stimulates early and heavy production of nuts and thereby increases the money returns.

Black walnut thrives only on very good, deep, fresh, well-drained soils. To attempt to grow it on very sandy, very poorly drained, or very thin soils will prove a mistake.

RANGE AND SUPPLY.

The black walnut is native over the greater portion of the eastern half of the United States. Originally, it was most abundant, and the trees attained their largest size in protected coves and rich valleys in the Appalachian region and the fertile bottomlands of the Ohio and central Mississippi River basins. The approximate boundary lines of its botanical and commercial ranges are shown in Figure 1. The commercial range includes the region where black walnut trees are found and are being cut in comparatively large numbers.

Black walnut trees are found naturally growing along with many hardwood trees. It is seldom found in pure stands, or as the dominant species of hardwood, except, occasionally, over small areas where soil and moisture conditions are particularly favorable. In the Central States, in fertile soils overlying limestone, hackberry, elm, black locust, ash, and several species of oaks are among the trees most commonly found with the black walnut. The remaining supply of black walnut is made up mostly by the isolated trees in the forest and on farms where it has been either preserved or planted. Occasionally it is found in groups or stands of considerable size which have been held as an investment.

The latest estimate (1920) of standing black walnut timber places the total amount roundly at about 820,000,000 board feet. It is probable that about half of the total black walnut is either in inaccessible places remote from railroads or held by owners not wanting to sell. The amounts by States ¹ in this estimate are as follows:

State.	Million board feet.	State.	Million board feet.
Missouri.....	107	Pennsylvania.....	26
Illinois.....	79	Nebraska.....	18
Kentucky.....	67	Oklahoma.....	18
Ohio.....	63	Michigan.....	15
West Virginia.....	60	North Carolina.....	14
Iowa.....	60	Wisconsin.....	10
Tennessee.....	60	Georgia.....	8
Arkansas.....	46	South Carolina.....	7
Indiana.....	44	Alabama.....	6
Texas.....	37	Maryland.....	5
Virginia.....	29	Mississippi.....	4
Kansas.....	27	Five others.....	10

Total for 28 States, 820,000,000 board feet.

WHERE WALNUT GROWS BEST.

Black walnut succeeds best in fertile clay or sandy loam soils, underlaid by clay subsoils, and alluvial soils which are both deep and moist, and well drained. The black walnut is not suited to extremes of temperature or moisture. It is not found in the extreme northern parts of the country, or in the far south, or at high altitudes; or in arid, alkaline, wet, or acid soils.

Black walnut is a tree of the agricultural class of soils. It is a mistake to attempt to grow black walnut on any but the better

¹ From Utilization of Black Walnut (Department of Agriculture Bulletin 909), by W. D. Brush.

situations. However, the tree is quite adaptable, and therefore, is not uncommonly found in sections which but partially meet its ideal requirements. It has been successfully transferred to at least some parts of nearly every State in the Union. Its ability to adapt itself to changed environment is indicated by the size and vigor of

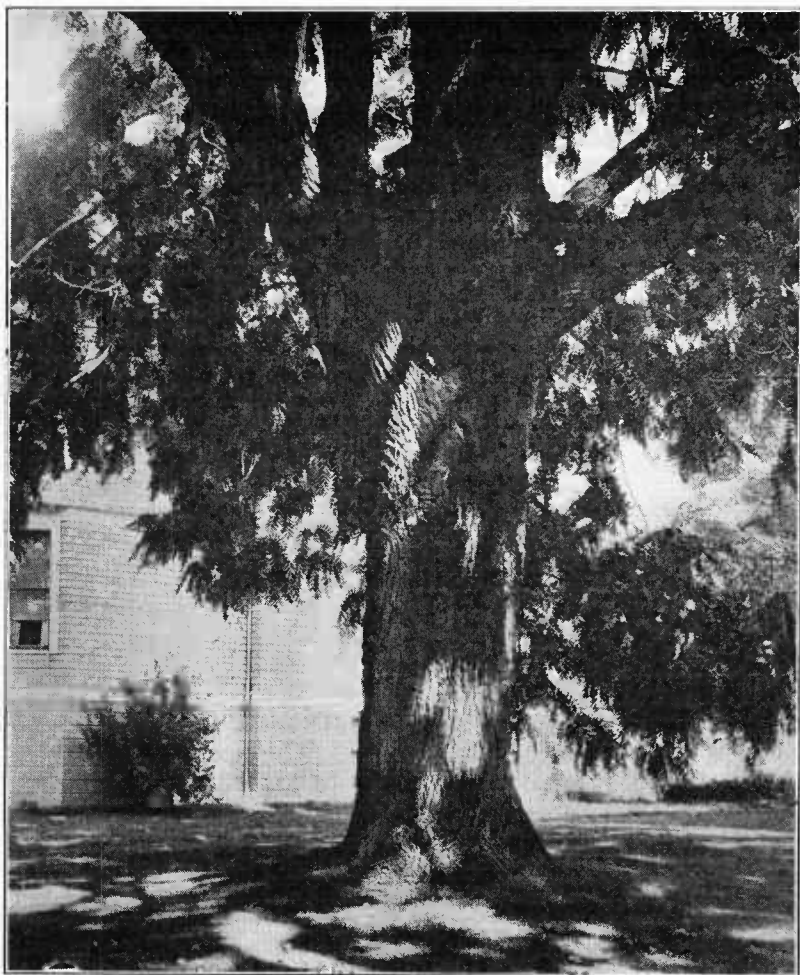


FIG. 2.—A 51-year-old black walnut tree in Salem, Oreg., measuring 10 feet 6 inches in circumference at breastheight. As the species is not indigenous to the Pacific Northwest, the size and grandeur of this tree illustrate the success of planting far outside of its range where conditions for growth are favorable.

a tree illustrated in Figure 2, showing a 51-year-old specimen in Salem, Oreg., grown from an eastern seed. When photographed in 1920, this tree measured 10 feet 6 inches around the trunk at breast-height. This is a splendid specimen for its age, irrespective of where grown, and its growth and fine appearance is typical of that frequently made by the black walnut under favorable conditions.

IMPORTANCE AND USES.**THE WOOD.**

The wood of black walnut—or “American” walnut, as it is commonly called in the market to distinguish it from Circassian walnut—possesses a rare combination of desirable qualities which makes it a premier cabinet wood, and one sought above all others for many other uses. Relative freedom from warping, checking, or splitting when alternately wet and dry, ease of working with tools, and durability in the presence of wood-decaying fungi and insects are its essential qualities. Further, it is hard, heavy, moderately straight-grained, stiff, and strong. The wood takes a high polish, and because of its dark color, which prevents soiling stains from showing, and characteristic texture of its grain, which makes it easily gripped and held in the hand, black walnut is especially suited for gunstocks, automobile steering wheels, and many other special uses. With the increasing scarcity and value of the wood, the sapwood is being stained by steaming and accepted equally with the heartwood. During the war black walnut was one of the woods chiefly used for airplane propellers; and the shells of the nuts were used in the manufacture of carbon for gas masks.

Black walnut is used extensively for furniture. The old walnut furniture was built mostly of solid pieces, of the dark-colored and close-ringed wood from forest-grown trees. Recently the demand has been strong for richly figured walnut furniture made with veneers from fast-grown, wide-ringed, lighter-colored, and coarse-grained wood. Large stumps and logs from trees grown in the open, rather than forest-grown walnut, yield this kind of wood. Black walnut has long been a standard and favorite wood for musical instruments, notably pianos and organs, and for sewing-machine tables, caskets, cabinet work, cases, picture frames, moldings, and many forms of ornamentation.

In the more remote districts, black walnut is still in demand for farm gates, fence posts, and other uses requiring a strong wood that is durable under conditions of widely varying heat and moisture. The increasing scarcity and value of the wood is however, rapidly putting an end to its use for such purposes.

VALUE OF THE NUTS.

At present, black-walnut kernels are being used principally in candy making. They are, however, being used also to a large and growing extent, in breads, cakes, salads, and other forms of food. In some eastern cities, black-walnut kernels are sold raw in increasing amounts by street venders, and during the late fall and winter months they have also been common on the fruit stands.

VALUE AS AN ORNAMENTAL TREE.

When at its best, the black walnut is of surpassing beauty of form and foliage, and of majestic size. Such development makes it one of the most graceful and attractive trees of the forest and cultivated lands.

The trees illustrated on the title page and in Figure 2 show the possible beauty and great size to which they frequently grow. The trunk of the tree pictured on the title page measured 14 feet 5 inches in circumference at breastheight. It was photographed in 1918. In the same year there stood by the roadside in Locust Valley, 3 miles west of Oyster Bay, Long Island, N. Y., a black-walnut tree measuring 15 feet in girth at breastheight. To one of the writers M. B. Waite, of the Bureau of Plant Industry, reported a tree in northwestern Illinois which, when cut, measured approximately 6 feet 6 inches across the stump.

Objections to black walnut for ornamental use are frequently raised on the grounds that the tree grows slowly, comes into leaf late in the spring, sheds its foliage early in the fall, and that shrubbery can be grown under it except with great difficulty. These



FIG. 3.—Two unsprayed black walnut trees in Lancaster County, Pa., showing the differences among individual trees in their natural tendency to shed or retain their foliage. When trees are desired which do not defoliate early, seed should be selected for planting from parent trees having that characteristic.

objections deserve consideration, but they may be largely overcome by following a few simple principles of plant breeding and landscaping.

In fertile soils, with proper moisture and tillage, the black walnut is one of the more rapid-growing of American trees, which are grown either for timber or as long-lived trees. A growth of 4 feet in height in a single season by trees raised from nuts, planted in rich soils, is so frequently noted as to demonstrate clearly that the rate of growth of the black walnut is largely in the hands of the planter.

The hardiness of the black walnut is due mainly to its ability to resist spring freezes because of lateness in leafing. Its first leaves and flowers usually appear well after most others trees have taken on their full summer appearance, and to the student of nature there is added charm in this ability to carry over until late spring the rugged winter appearance.

Early falling of leaves in autumn is in great part due to fungi and insects, both of which may be counteracted largely, if not wholly, by spraying. As to how early the leaves fall depends to some extent on the individuality of the tree. Figure 3 illustrates two unsprayed trees in Lancaster County, Pa.—one almost entirely denuded, and the other still in full leaf, when both were photographed late in September. Undoubtedly much might be accomplished toward developing trees that leaf out early in the spring and shed late in the fall by selecting seed for planting from trees that have these tendencies.

The black walnut is especially well adapted for planting along highways and private driveways, where avenue trees are desired. Its effectiveness for this purpose is illustrated in Figure 4. This shows the black walnut alternated with shagbark hickory.



FIG. 4.—Black walnut as a roadside tree—here planted alternately with shagbark hickory (Washtenaw County, Mich.). Better results are usually had by planting roadsides to a single species. The results in this case, however, are satisfactory. For roadside planting it is well to consider the advisability of choosing species bearing edible nuts.

In localities favorable to the growth of black walnut, north of the limits of the pecan, which, broadly speaking, may be regarded as the thirty-seventh parallel, it is doubtful whether any other species will give value in the way of human food, reserve timber supply, shade, and ornamental effect equal to that provided by the black walnut.

It is admittedly difficult to maintain a good growth of many kinds of shrubs under the branches of black-walnut trees, but grass will grow luxuriantly in fertile soil up to the very base of the tree, as is shown on the title page and by Figure 5. The grass in both cases was in excellent condition when the pictures were taken.

The importance of the wood for utility purposes and the desirable qualities of the black walnut as a tree, not overlooking the frequent and prolific crops of edible nuts, all suggest choosing the black

walnut as a memorial tree. The black walnut grows well over a wide range; it grows rapidly in favorable soils; it is comparatively free from serious attack by insects and fungous diseases; and it is attractive in form, is long lived, and attains to large size. These things commend it for memorial planting.

RELATED SPECIES.

The black walnut is closely related to the American butternut (*Juglans cinerea* L.), the Japanesc walnut (*J. sieboldiana* Maxim.), the Persian (English)¹ walnut (*J. regia* L.), the Mexican walnut (*J. rupestris* Engelm.), the California walnut (*J. californica* Watson,



FIG. 5.—Black walnut trees, bluegrass, and cattle fully utilizing part of a Kentucky farm. Grass grows well beneath black walnut because of its deep root system and its thin open foliage, which casts only a light shade. The trees here are 20 years old and grew from nuts planted in place.

the Hinds walnut (*J. hindsii* Jepson), and to various other less important species. It belongs to the same botanical family as the hickories, including the pecan, but to a different genus. It is not easily confused with any other kind of walnut, except to some extent with those of the West and Southwest, which are more dwarf in habit, slower in growth, and of finer foliage. With the exception of the butternut, the black walnut freely interbreeds with most of the others, blossoming at the same time where grown in close proximity. Buds of the black walnut may be successfully grafted or budded on stocks of any of the other kinds, and vice versa. However, none of these other species is equal in timber value to the black walnut and none has so great a geographic range, nor are the nuts of any other native species of equal value.

¹ The wood is sold as Circassian walnut.

BLACK WALNUT HYBRIDS AND THEIR USES.

Certain species of walnut hybridize so readily that when pure types are desired it is not safe to plant the seed of these kinds where cross-pollenizing may take place. On the Pacific coast hybrids between the eastern black and the indigenous species are known as "Royal" and those between any black walnut and the Persian walnut as "Paradox."

The Royal walnut affords exception to the usual rule of hybrids, in that ordinarily it is a heavy bearer of nuts of good or at least fair quality. This hybrid has been advertised widely as a timber tree, but the facts as to its value for timber have not yet been determined. Such reports concerning the Royal walnut in the Eastern States as have come to the attention of the writers are conflicting. So far as known, it has not been planted anywhere to any large extent. Until experience has demonstrated the worth of the Royal walnut as a forest tree it is felt that planting of it should be on a conservation basis rather than on a large scale for commercial purposes.

Supposedly natural hybrids of the black walnut and the Persian are not unknown in the Eastern States. Except on the Pacific coast, however, walnut hybrids are not numerous; nor are they systematically being put to good use, as is the case in the West, where to a considerable extent the Royal serves as a stock upon which the finer varieties of Persian or "English" walnut are grafted.

In common with hybrids of other species of plants, those of the walnut vary in vigor from rank growth to the opposite extreme. The proportion of individual hybrids suitable for use as stocks is not necessarily high. Such hybrids are at a further disadvantage for this purpose in that hybrid forms seldom reproduce themselves even fairly true to type from seed. Therefore new seed known to have developed from cross-pollinated flowers must be had each year, and consequently, desirable as good hybrids may otherwise be, they are available only at considerable expense of labor and the hazard of great uncertainty and are within reach of but few nurseries.

The crossing of walnuts for the purposes of perfecting desirable stocks and for the improvement of varieties is a field thus far little developed. This is no doubt due largely to the length of time commonly thought necessary for walnut trees to come into bearing and for the results of such hybridization to become known. In regard to this point, it is the common practice of tree breeders to save the time required in waiting for each seedling to come into bearing on its own roots by budding or grafting the seedling upon older trees as soon as the seedling has a top of sufficient size to produce buds. In this way it is often possible to have bearing trees in four to six years from the time of making the first cross.

In view of the possibilities offered not only of bringing into existence either superior varieties or stocks, or both, but also ornamental and timber trees of value, the hybridizing of the various forms of walnuts offers a particularly inviting field to the plant breeder.

GROWING BLACK WALNUT FOR TIMBER.**WHERE TO PLANT.**

Black walnut may be profitably planted in unused or so-called "waste" places about the farm and in good-sized openings in woodlands. Rough, hilly places where the soil is good but otherwise poorly adapted to successful agriculture, large fence corners, fence rows, hollows, ravines, stream banks, and large pockets of good soil among rocky outcroppings in fields and pastures afford excellent places for growing black walnut. Often the mistake is made of allowing sycamore, soft maple, alder, willow, beech, black gum, dogwood, and worthless shrubs to occupy such places, even when they offer favorable conditions for walnut growth. In limestone regions spots of deep soil near ledges and outcroppings are good places for walnuts.

Another place to grow black walnut is about the farmyard as shade trees. In such locations nut trees are especially appreciated and profitable. Black walnut is suggested as one of the most desirable trees for stretches of good soil in roadside planting (p. 7). The open foliage casts only a light shade.

Planting black walnut in the larger openings in woodlands having good soil and moisture conditions is recommended as a means of improving the composition of the forest and increasing the future money returns. It is substituting good trees for poor ones—for the poor ones are usually the first to occupy such openings whenever nature is allowed to take its course. Since black walnut requires an abundance of light, it should never be underplanted in small openings in woodlands of good-sized trees, or in mixture with any faster growing trees. Its crown must be fully exposed to overhead light and it must have an ample supply of side light. The foliage, or crown, of black walnut is open, seldom forming sufficient shade to exclude grass. For this reason the walnut stands in very good favor among farmers as a tree for fields and pastures. In the bluegrass regions underlaid with limestone, the most luxuriant growth of grass is found, as a rule, beneath black walnut trees. The open form of planting suggested above will tend to keep alive the lower limbs, and the trees may require occasional pruning, although black walnut does not retain these branches as tenaciously as the shade-enduring kinds of trees.

Plantations of black walnut growing in a regular formation and covering tracts, sometimes several acres in area, have been established in considerable numbers, more especially a few decades ago. These are scattered widely from Ohio to Nebraska and south to Georgia and Texas. Close plantings of this sort should be attempted only on good soil and in accordance with suggestions found in the discussion of "close or regular planting." Rich soils in large areas are usually more profitable when devoted to farm crops.

Planting in the various situations suggested, often at the expense of only a little labor, will be a good step toward securing useful and money-making trees on parts of the farm which would otherwise be idle. Many thousands of walnut trees—formerly growing in cultivated fields and pastures and affording refreshing shade in midsummer to men and livestock, in addition to producing annual crops

of nuts—have, in the past few years of high timber prices, been cut and sold. Many of these places need to be replanted.

PLANTING THE NUTS.

Black walnuts may be started by planting the nuts in the places where the trees are desired or by growing seedlings in a garden or nursery bed for transplanting at the end of one year. It is advisable to select the seed nuts carefully with regard to their size and quality and the health and vigor of the tree producing them. (See also p. 23.)

Planting the nuts directly in the field has generally been regarded as the better method (fig. 5), but this may not be advisable where squirrels or hogs are likely to cause considerable damage or loss, or the soil heaves badly by frost. The menace from rodents can be regulated to some extent by using traps or poisoned bait. Heaving of the soil due to frost may be counteracted by placing straw, grass, or leaf litter over the seed spot after planting the nuts. If the nuts are planted at the proper time in the spring, when most of them germinate in a short time, the danger of loss from these causes is greatly reduced. Usually a small percentage of the nuts fails to germinate the first season.

The nuts may be planted as soon as they are ripe in the fall, or in early winter or the following spring. If not planted in the fall or early winter, the nuts must be stored with some care in order to get good germination from spring planting. Late fall planting can often be done after the rush of farm work is over. The seed is then in place to commence germination with the opening of spring. Since not every nut is fertile, at least two nuts should be placed in each hole or seed spot, and where both come up, in midsummer, one should be pulled or cut off well under ground.

The nuts should be covered about 2 inches deep, and the soil pressed down firm to prevent rapid drying. Shallow planting, 1 to 3 inches deep, with a light mulch, it is believed, will give better results than planting 4 to 6 inches deep. In loose, deep soil in nurseries, many walnuts are planted in furrows opened by a plow to a depth of 4 inches or more.

In planting the nuts, a mattock or broad pick may be used. In grass sod it is well to dig up the soil for a foot or so around the seedspot before sowing, in order to check early competition from grass or weeds. If the soil is loose and fresh and labor is scarce, fall planting may be done quickly by simply pressing the nuts an inch or two into the ground with the shoe-heel and scraping some soil over them, but the results are likely to be less satisfactory than those from more careful planting.

If planted in the spring, the nuts are removed from storage (see below) about the time germination takes place, and planted at once. It will be found that the kernels of most of the nuts are swollen and the halves of the shell more or less loosened after winter keeping, requiring very careful handling in order to prevent injury. In fact, it is well to take only the sprouted nuts, leaving the hold-overs until the following spring. The sprouted nuts are carefully placed in well-loosened soil and covered with about 2 inches of top soil.

A spacing of the nuts about 8 feet apart each way is generally to be recommended. This means 680 trees per acre.

A bushel of walnuts contains from 1,100 to 1,400 nuts, and allowing 2 in a hole and spacing 8 feet each way, will be sufficient to plant an acre. If trees are started 10 to 20 feet apart along fence rows, every other one can be spared in later thinnings to form rows with 20 or 40-foot spacings in the final stand.

STORING SEED NUTS OVER WINTER.

In holding black walnuts over winter for spring planting, the essential point is to prevent drying of the kernels and to keep them cool, so as to avoid too early germination. If kept over winter in this condition, the majority of the walnut seeds will germinate the following spring, and the remainder of the good seed a year later, if undisturbed. In the retention of germinative power, walnuts are much ahead of acorns and chestnuts.

The nuts may be stored in a cellar, ground cave, or soil pit dug for the purpose. The latter probably gives the best results, although good results often come from cellar storage. Walnuts to be stored

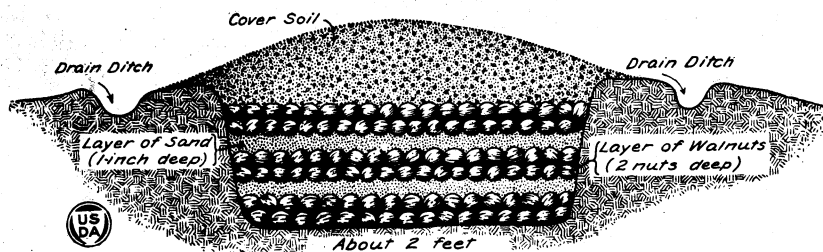


FIG. 6.—Soil pit for storing black walnuts over winter.

successfully in a cellar should be mixed with moist sand, either in the cellar bottom or in a box, and kept moist and cool to check early sprouting. It is possible also to keep nuts over winter spread out on the ground and covered with a layer of soil, on the north side of a building, where they will be safe from the effect of unusual warm spells. The spot must be well drained. Freezing is not harmful if the nuts are properly stored, particularly if it is not alternated with periods of frequent thawing. For a soil pit, a well-drained location should be chosen. A shallow trench is opened from 8 to 12 inches deep, from 2 to 3 feet wide, and as long as needed for the quantity of nuts to be stored. The nuts, as shown in Figure 6, are placed in the bottom of the pit and covered with about 1 inch of sand or sandy loam. Other layers are added above, and the pit is finally covered with soil mounded over the center so as to shed water. It is essential to open a drain ditch on either side to avoid excess water entering the pit.

Nuts stored over winter in such "caches" as here described are particularly subject to depredations of squirrels and various other rodents, and where these animals are likely to be present in the neighborhood it will be necessary to use wire screen for protection. Nuts have often been lost over winter because of poor conditions of storage, which have caused them to heat and mold, or to sprout

much in advance of planting time, so that it was impossible to handle them without too much damage to the roots.

GROWING AND PLANTING SEEDLING TREES.

Black-walnut seedlings are easily grown in the nursery, but, because they have strong, deep taproots, require special care in lifting and transplanting. To grow seedlings for timber purposes, the nuts should be planted close together, almost touching one another, in furrows 3 feet apart, and covered about 2 inches deep. With careful, thorough cultivation in rich soils, the seedlings during the first season should attain heights from 8 to 15 inches, as shown in Figure 7. They are then ready for transplanting to their permanent positions in the field or woods. Early the following spring they should be taken up carefully and the taproots pruned with a sharp knife

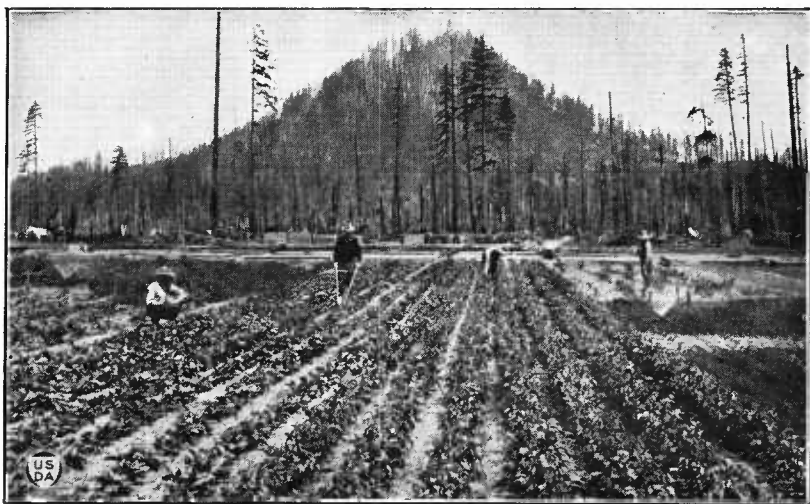


FIG. 7.—Growing black walnut seedlings in nursery beds. The seven rows at the right are 1 year old and are ready for permanent transplanting. While this method is more expensive than that of planting the nuts in place, it usually gives earlier and more uniform results.

at lengths of from 8 to 12 inches. Standard commercial nursery concerns grow black-walnut seedlings and ship them long distances successfully by following these precautions. The roots should be kept moist at all times, and when the seedlings are set the soil should be well firmed about them. A mulch of leaves or straw about the young trees will aid in checking rapid drying and weed growth. If proper care is observed, few trees should be lost in transplanting by this method.

Planting nursery-grown seedlings in the field or woods is obviously a more expensive method than direct nut planting, and is, furthermore, usually unnecessary. If seedling trees are used, however, the resulting stand is likely to be more uniform and generally more satisfactory, especially where hogs or rodent pests are present. Young trees, a foot or more high when planted, have some advantage during the first year in competing with weeds and grass over seedlings grown from nuts planted in place.

CLOSE OR REGULAR PLANTING.

Close plantations of black walnut utilize all of the ground for timber production. Good agricultural soil is necessary, and because profits are likely to be larger from field crops, plantations of any considerable size are not generally advisable. Experience shows many mistakes by using tracts of rich tillable soil for growing walnuts. Open-grown walnut trees produce logs of merchantable size



FIG. 8.—Open spacing results in more rapid growth of the tree and earlier production of merchantable timber.

and good crops of nuts much sooner than do close-grown trees, while at the same time permitting pasturing.

In establishing regular plantations the soil should, if possible, be prepared in advance of planting by breaking up the ground. In the prairie region complete breaking and harrowing of the ground is advised, for it is often possible to put in agricultural crops for one or two years in advance of planting. The nuts, or the nursery-grown seedlings, are usually planted in rows. The spacing will

vary in different localities, but an interval of about 8 feet each way is probably about an average distance. The spacing and arrangement of trees in walnut plantations will depend largely upon whether the primary aim is to produce timber or nuts, or a combination of both products. (See figs. 8 and 9.)

Since black walnut is an open-foliaged tree, making only a light shade, better results may be expected in close plantations by inter-



FIG. 9.—Close spacing favors the growth of long, slender, clear trunks.

planting with some heavier-foliaged tree which grows at a somewhat slower rate. The heavier-foliaged tree will be helpful in shading the ground against the growth of weeds and grass, in stimulating a rapid upward growth, and in shading out the lower limbs of the walnut. Later the heavier-foliaged trees should be cut out, leaving the walnut to finish its growth free from over-competition for light and soil space. Trees having the necessary requirements for such a mixture are not numerous and should be selected with care. Sugar

maple appears to be one of the best, and in districts where the apple industry is not prominent red cedar might be planted in the mixture because of its value as post timber along with its slow growth. In other regions the cedar-apple rust, as is well known, makes the growing of red cedar inadvisable.



FIG. 10.—A black-walnut grove 18 years old started by planting nuts in plowed ground, which has subsequently not been worked. The stand has never been thinned, resulting in irregular spacing of trees and slow individual development.

CARE OF PLANTED TREES.

Experiments conducted by Purdue University indicate that in the growing of close-planted (6 or 8 feet apart) black-walnut trees little or no cultivation is required, as the seedlings grow faster and straighter by being forced into competition with other plants. If an intercrop is wanted for growing midway between the rows, corn is perhaps the most satisfactory. This crop may be continued until

the time when the trees become large enough to occupy most of the space and furnish shade.

In pastures and other places devoted to grazing the young trees will require protection against stock. This will mean temporary wire or board inclosures around individual trees or groups of trees, as may seem necessary. Volunteer walnut trees springing up along fence rows and roadsides should be cared for in the same way and conserved in preference to the less valuable species. Excessive grazing is always inadvisable in stands of timber, for it results in damage to the trees both directly and indirectly through packing the soil and breaking up the protective leaf litter.



FIG. 11.—Selecting and marking trees to be thinned from a crowded black-walnut grove. Two acres were planted 30 years ago, but the owner, like very many others, has been too reluctant to thin the stand, making it necessary now to cut out some trees of fairly good size but unmerchantable for saw-logs.

Of the few insect enemies of black walnut, the tent caterpillar is perhaps the most serious, as it is the most common and conspicuous. Unless checked, it sometimes completely defoliates the tree. It may be destroyed by spraying with an arsenical solution, or better, by capturing the insect masses when congregated on the tree trunk for molting. For information about harmful insects and methods of exterminating them, write to your State entomologist or to the Bureau of Entomology, United States Department of Agriculture, Washington, D. C. The black walnut is comparatively free from

tree diseases, including the fungi which, in many other kinds of trees, cause wood rot. The foliage is, however, susceptible to certain diseases causing the leaves to fall, and spraying may become necessary, particularly when the trees are grown for nut production. As far as possible, seed for planting should be chosen from trees known to be resistant to such diseases.

While black walnut, grown in close stands, sheds its lower branches more readily than do the other kinds of trees which endure more shade than the walnut, the lower branches of trees grown in the open usually persist for some years, and should be removed from time to time in order to develop clear logs, which bring the highest prices.

Close spacing tends to encourage the development of long, straight, clean trunks of relatively small diameter, and wide spacing the opposite form. It follows, therefore, that in close plantations the character of the thinnings helps largely to determine the size and value of the individual trees. Figure 10 shows an 18-year-old planting of walnut, which was not thinned until the fifteenth year. It was much overcrowded, which has resulted in small, slender stems, now averaging nearly 30 feet tall and only 3 to 4 inches in diameter at breast height. Thinnings made at the proper time would have greatly stimulated growth in the remaining trees and thereby increased their value. The importance of proper thinning at the right time, as shown in Figure 11, can hardly be overemphasized.

GROWTH AND RETURNS.

In good soil and situations which are adapted to it, the black walnut is a moderately rapid grower. In central Indiana and Ohio "grove" walnut averages something like 35 feet in height at 20 years, 53 feet at 30 years, 68 feet at 50 years, and 82 feet at 100 years. This is a growth of nearly 2 feet a year at 20 years, slowing down gradually to about a foot a year at 35 years.

TABLE 1.—*Growth in height of black walnut in rather open stands in central Indiana and Ohio.*¹

Age.		Age.	
Average height of trees.		Average height of trees.	
Years.	Feet.	Years.	Feet.
10	13	60	72
20	35	70	75
30	53	80	78
40	62	90	81
50	68	100	82

¹Department of Agriculture Bulletin 933. "Black Walnut: Its Growth and Management," by F. S. Baker.

The measurement of 128 trees, scattered through 6 States, and ranging in age from 10 to 30 years, showed a growth of 1 inch in diameter (at breast height) every two and one-half years; at 30 to 50 years about an inch in three years; at 50 to 70 years an inch in 4 to 5 years.

TABLE 2.—Growth in diameter (breast high) of black-walnut trees under average conditions (measurements of 128 trees in 6 States from Virginia to Illinois).¹

Age.		Age.	
Average diameter of trees.		Average diameter of trees.	
Years.	Inches.	Years.	Inches.
10	1.2	60	18.3
20	5.0	70	20.6
30	8.8	80	22.2
40	12.5	90	23.8
50	15.7	100	25.0

¹ Department of Agriculture Bulletin 933.

In considering rate of growth it is necessary to distinguish clearly between open-grown and close-grown trees and stands. (See figs. 8 and 9.) The intimate relation between the supply of light and soil moisture and the rate of development of the individual tree is generally well known. Growing of black walnut commercially is concerned essentially with the individual tree rather than with large numbers in a stand, as is the case, for example, with the pines. Table 3 indicates fairly well the board-feet measure of black-walnut trees of various ages in groves in the Ohio Valley region. The figures given do not apply to single trees or to rows of trees grown in the open, which would show faster growth.

TABLE 3.—Volume in board feet of black-walnut trees grown in groves in the Ohio Valley region.¹

Age.		Average yearly growth in volume.	
		Current or present rate.	Average rate from the beginning.
Years.	Board feet.	Board feet.	Board feet.
50	48	.....	1.0
60	100	5.2	1.7
70	150	5.0	2.1
80	200	5.0	2.5
90	260	6.0	2.9
100	320	6.0	3.2

¹ Department of Agriculture Bulletin 933.

Information concerning 12 planted stands of black walnut, from 12 to 42 years old, is given in Table 4. Because of very close spacing and crowding, the trees, even at the older ages, have hardly reached saw-log sizes, and hence the yields are low and shown in cords.

TABLE 4.—Average measurements of 12 closely-planted stands of black walnut of various ages.¹

Age.	Average height of trees.	Average diameter (breasthigh) of trees.	Yield per acre.	Number of trees per acre (at present).	Original spacing when planted.	Kind of soil.	State.
<i>Years.</i>	<i>Feet.</i>	<i>Inches.</i>	<i>Cords.</i>		<i>Feet.</i>		
12.....	27	3.8	7.5	512	4½ by 6	Black sandy loam...	Indiana.
25.....	42	6.3	14.8	359	8 by 8	Black loam.....	Iowa.
28.....	42	5.5	17.9	548	8 by 8	.....do.....	Do.
28.....	26	4.1	8.6	708	1½ by 7	.....do.....	Do.
28.....	41	7.0	20.0	342	4 by 4	Black sandy loam...	Do.
31.....	51	7.0	34.6	492	4 by 5	Black loam.....	Do.
32.....	54	8.3	24.2	239	5 by 13	.....do.....	Do.
35.....	46	8.7	12.4	149	8 by 9	Black sandy loam...	Do.
37.....	44	7.7	9.1	136	8 by 8	Black loam.....	Do.
38.....	55	8.6	33.8	303	8 by 8	.....do.....	Illinois.
40.....	52	8.3	31.8	321	4 by 4	.....do.....	Iowa.
42.....	66	12.3	39.6	138	7 by 12	.....do.....	Do.

¹ Forest Planting in the Eastern United States, Department of Agriculture Bulletin 153, by C R. Tillotson.



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FIG. 12.—Butt log of black walnut tree 76 years old, grown on a farm in middle Tennessee, from which two body logs and three limb logs, scaling 1,150 board feet, were cut. Delivered on the car, this log (35 inches in top diameter) brought \$95.85 and the five logs \$164.84. As it cost \$15 to cut and haul the logs, the net profit was large.

One of the fastest-growing and most profitable walnut trees seen by either of the writers grew by itself, in deep soil, near a small stream, on a farm in central Tennessee. The tree when cut was 76 years old and yielded two body logs, each 12 feet in length, and three short top logs, scaling a total of 1,150 board feet, and selling at the railroad for \$164.84. The butt log (fig. 12) measured 35 inches in diameter at the top end, scaled 710 board feet, and loaded on the car brought the owner \$95.85. These figures probably are close to the maximum average production for single trees—an average growth of nearly 15 board feet per year for 76 years, and an average gross return of \$2.17 per year.

In general it takes from 40 to 60 years to grow merchantable walnut lumber. Assuming a rate of growth of 5 to 10 board feet per year for open-grown trees, and a value of \$50 to \$70 per thousand feet standing on the stump, walnut trees at 60 years of age will return gross incomes of \$15 to \$42. The value of walnut timber increases rapidly per board foot with increase in the size and clearness of the log.

GROWING BLACK WALNUT FOR NUTS.

THE NUT INDUSTRY.

The shell of the ordinary black walnut is cracked and the kernels extracted only with considerable difficulty. Usually the kernel parts are taken out in quarter pieces or smaller. A Baltimore firm dealing largely in walnut kernels estimates that not more than 35 per cent are received as quarter pieces. Fully 65 per cent are smaller. The proportion of perfect halves is not appreciable. In spite of the difficulty in cracking, the market demand for nuts in the shell is now materially on the increase. Prices to the grower, which until recent years were from \$1 to \$2 per bushel, have lately ranged from \$2 to \$4, depending largely upon the size and cracking quality, character of the kernels, size of crop, local market conditions, etc.

In certain districts, notably in eastern Tennessee, western North Carolina, and southern West Virginia, large quantities of walnuts are gathered in the fall. These are cured and cracked in early winter by the family. The kernels are bought by local merchants, who formerly shipped almost exclusively to large dealers, mainly in Baltimore and Philadelphia. More recently a direct trade has developed between the country merchants and candy manufacturers of other cities. One such merchant in Johnson City, Tenn., reports two shipments in the fall of 1919, each of 10,000 pounds, to a candy concern in Cleveland, Ohio, for which he received 72½ cents a pound f. o. b. his shipping point.

The total extent of the black-walnut kernel industry is indicated by this merchant, who said his total trade for that same year (1919), which thus far had been his best year, amounted to approximately 40,000 pounds. It has been estimated (March, 1924) that from 4,000 to 5,000 barrels of walnut kernels are shipped annually from the eastern half of Tennessee and adjacent parts of Virginia and North Carolina. The February, 1913, number of *American Fruits*,² states that "14 cars, or a total of 210,000 pounds of walnut kernels for which the dealers received an average of 15 cents a pound, were shipped from Morristown, Tenn., during the preceding months."

The *American Nut Journal*,³ for December, 1922, reports the following:

Greene County, Tenn., this season shipped 210,000 pounds of walnut kernels, according to a dispatch from Greeneville. On one day late in October \$7,000 was paid out in Greeneville for the kernels. A good cracker can earn 40 cents an hour.

² *American Fruits Publishing Co., Rochester, N. Y., p. 50.*

³ *American Fruits Publishing Co., Rochester, N. Y., p. 77.*

The same issue of the Journal also says:

Rogersville, Hawkins County, in northeastern Tennessee, claims the distinction of being the largest black-walnut kernel market in the country. In two weeks this season the merchants have shipped out kernels at 55 cents per pound to the value of \$18,000. The later price will be 35 cents. The kernels go mainly to eastern markets for confectionery and baked goods. The crop was only fair this year. A large crop comes once in five years.

On one farm in Caney Valley there are 150 trees, yet this large orchard will not produce more than 50 bushels of hulled walnuts.

The time may come when a cultivated, or improved, walnut may be planted out for nut bearing in the county to good advantage. The rich limestone bluegrass lands produce more black-walnut trees perhaps than any east-Tennessee section. Thousands of families get a livelihood out of collecting and marketing the kernels.

This nut industry began in a small way as early as 1900 with a range of prices of from 6 to 8 cents a pound to the farmers. By 1917, despite fluctuations, the price had risen to 15 cents for the best grade. The seasons of 1918-19 and 1919-20 witnessed a phenomenal rise when, during the latter period, 50 to 60 cents a pound was paid. In 1920-21 the price dropped to about 35 cents per pound. In the fall of 1922 it ranged from 35 to 65 cents per pound.

Barrels of walnut kernels weigh from 200 to 225 pounds net. Based upon the above estimate it appears that some 200,000 pounds would represent the yearly output of walnut kernels from the eastern Tennessee district. At the lower price of 50 cents, quoted for 1919-20, or the average price for 1922-23, the gross return would have been \$140,000. As the proportion of kernel to total weight of nut does not average more than 35 per cent it appears that fully 40,000 barrels of nuts are cracked in this district.

To a steadily increasing extent walnut kernels are becoming staples of the market. During recent late fall and early winter months they have been common in markets of many eastern cities, where, in the form of pieces, they are sold by street venders in small lot quantities at prices which would be the equivalent of 85 cents to \$1.25 per pound.

An Illinois grower who has had long experience in cracking walnuts of the Thomas variety (see p. 27) reports no difficulty in selling the kernels in local wholesale markets at \$1 a pound (1922), and states that by actual measure he not infrequently gets 10 pounds of kernels per bushel of whole nuts. In this way he markets his walnuts at \$10 per bushel. The same walnuts sell readily at \$4 a bushel in the shell.

ADVISABILITY OF GROWING FOR NUTS.

For the present the nut crop of the black walnut should be regarded only as incidental to the general farm operations, a by-product of the farm and not a staple crop. Nut crops are strictly speculative.

The writers are not aware of the existence in the entire country of a mature orchard of black walnut trees which was planted primarily for nuts. In several cases a few dozen trees have been planted, but without exception they are either not yet of commercial bearing age or for some other reason have not borne nuts to profitable extent. The great majority of such plantings have been of seedling stock and therefore are variable and uncertain as to character and quantity of

product. Often the planter has lost interest in the trees or has disposed of the property.

With the situation as it is, both with respect to forestry and orchard planting, the question arises, Why encourage planting black walnut? The writers, whose conclusions coincide closely with those of others who have given the subject careful thought, would answer as follows:

1. Fertile, tillable farm land having established value for other agricultural crops, should not now be planted to black-walnut trees if the planter is dependent upon the land for a paying income.

2. Until more rapid-growing strains are developed than are now available for timber purposes, or until better nut-bearing varieties appear and establish their value, planting of black walnut should be restricted to fertile land otherwise unused.

3. There is enough unused but fertile land well suited to walnut planting available on steep hillsides, along ditches, on stream banks, by roadways, in private lanes and drives, fence corners, parks, door-yards, and other places within the range of the species to afford abundant opportunity for rapid and normal expansion of the black-walnut nut industry at inappreciable cost. Development along these lines should add very greatly to the total agricultural wealth and welfare of the entire country.

4. Great and worthy public service may be rendered by planting black-walnut trees in such places. This is a matter of sufficient importance to engage the earnest attention of educators generally. School-teachers over the entire country can do a great deal by encouraging children to plant useful tree seeds wherever there are idle areas of fertile land.

5. Wherever it is desired to stimulate nut production, young, thrifty black walnut trees of from 15 to 50 feet in height may quickly be converted into bearing trees by cutting back the tops and grafting over with scions of promising varieties now available and awaiting such test. This procedure will add greatly to the interest in nut culture on the part of the average farmer, to his general knowledge of horticulture, and inevitably, although perhaps gradually, to his material wealth.

SELECTING THE SEED.

The walnuts to be used for seed, whether it is desired to produce timber or nuts, should, as far as possible, come from trees having the characteristics one desires to perpetuate. Seed from slow-growing, dwarf, spindling, or weak trees, trees especially late in leafing out in spring or early in defoliating in fall, or trees which are markedly susceptible to either fungi or insect pests, is to be avoided. Seed should be chosen from rapid-growing, vigorous, and symmetrical trees. If for nut production, the parent trees should also be heavy annual bearers, and the nuts large, thin shelled, easy to crack, with both parts of the kernel readily released from the cracked shell as perfect halves. The kernel should be bright colored, plump, rich in quality, and of a pleasant and mild rather than strong flavor.

When necessary or desirable to obtain seed from a distance, due precaution should be taken to avoid using that from a locality of decidedly more mild climatic conditions. For example, seed from

Kentucky or Tennessee should not be planted in Michigan or Wisconsin, nor seed from Maryland in New England. If good seed can be had from a near-by source, it should be used, although there is practically no danger in carrying seed considerable distances from north to south.

SEEDLINGS v. BUDDED OR GRAFTED TREES.

Nut trees grown from seed seldom reproduce themselves true to variety. No matter how closely related to each other the two parent trees may have been, or even if self-pollinated, there will almost always be differences in offspring plainly discernible to any but the most inexperienced observers. Claims to the opposite effect are not infrequently made by misinformed tree agents. Occasionally pictures are shown illustrating a tree inclosed within a tent at blooming time supposedly to prevent all possibility of interpollination. Prospective buyers should under no circumstances be misled by such pictures, but should regard such trees strictly as seedlings of unknown parentage.

The planting of seedling trees for nut production must not be discouraged, as seedlings afford the only practical source of new varieties within reach of the average grower. So far as the black walnut is concerned, there are yet very few varieties available from the nurserymen, and of such all are comparatively new and practically untested, either as to the fruitfulness of grafted trees or as to the adaptability of the varieties to localities other than their places of origin. Therefore, for the present, black-walnut planting on an extensive scale must depend almost wholly upon seedling trees. These, of course, may be top-worked later, as superior kinds become available if that should then be desired.

Nursery-grown budded or grafted trees are superior to seedlings for orchard planting, in that their nuts will be practically like those borne by the tree from which the scions were obtained. Such differences as there are will be due to environment, age of trees, etc., just as orchard fruits of the same variety show differences when grown in different orchards or in different localities.

A way of establishing an orchard sometimes recommended and one which, though successfully practiced in forestry planting, seldom results in profitable, or at least in uniform orchards, is that of planting several nuts in a hill, where permanent trees are desired, and later budding or grafting the strongest grower with scions of desired varieties. But this method is not regarded as good practice.⁴

As compared with each other, budded trees ordinarily are preferable to grafted stock, in that they are less subject to a certain type of winter injury during their early life as orchard trees. Above the point of union, irrespective of whether the trees have been budded or grafted, for five or six years the bark of the trunk will be smooth and without the natural protecting scales below that point. In some years, freezing of the trunks of trees propagated low is a serious matter. As the operation of grafting in the nursery is usually performed below the surface of the ground, this rough

⁴ The reasons are more fully explained in *Farmers' Bulletin 700*, p. 7, *Pecan Culture*, with Special Reference to Propagation and Varieties.

bark is entirely done away with for the time being and the tree trunk left without protection. Budding is usually performed a foot or more above ground, thus leaving a protection for the lower part of the trunk at the point where it is most subject to this form of winter injury. An illustration of the differences in character of bark above and below the point of budding is shown in Figure 13. Loss from winter injury with root-grafted nut trees, especially with pecans in the South, is not infrequently quite heavy; in the North, some planters of experience will not plant root-grafted nut trees.

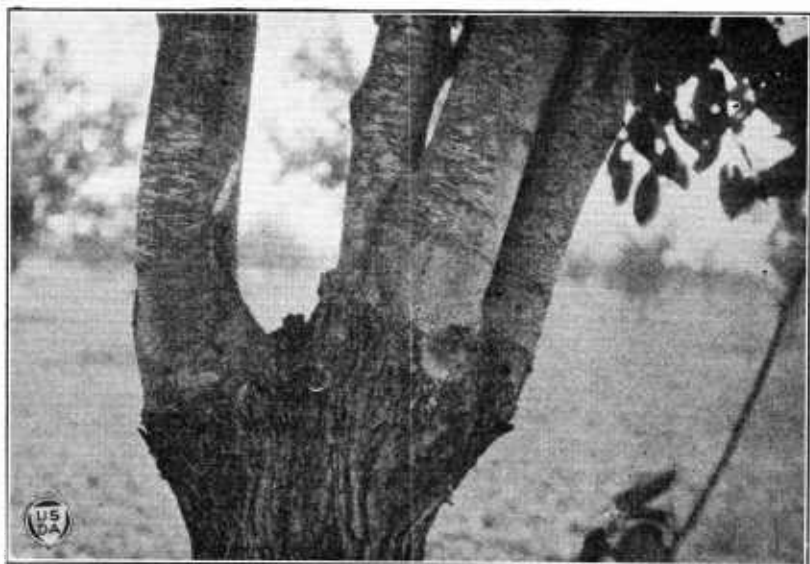


FIG. 13.—The difference in the character of bark of a walnut tree below and above the point at which it was grafted.

INSTRUCTIONS FOR ORCHARD PLANTING.

In planting for nut production, trees should be allowed 60 feet of space each way, unless in thin or poor soil, in which case they will not grow as large and may be given less space. At 60 feet, 12 trees will be required per acre; at 50 feet, 17 will be required; and at 46 feet 8 inches, 20 trees. If the soil is not the best, a large hole should be dug and filled in with top soil. All injured roots and branches should be pruned away and the tree planted about as deep as it was in the nursery. Special pains should be taken to set the tree no deeper than it stood in the nursery. If it is deeper it will have to stand in a depression, or soil will have to be filled in around the trunk. In the former case, excess surface water will be likely to collect at the base of the tree, and in either case the tree will likely have difficulty in surviving.

If the tree has been purchased from an experienced nurseryman, the question of cutting the taproot has been settled. The nurseryman has cut it at from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet below the surface. Many

nurserymen dig and transplant the trees in the nursery at least once before budding or grafting, in order to insure cutting the tap-root and stimulating the development of a lateral root system. The welfare of the tree is materially promoted by this process. If the grower has trees of his own for transplanting, he may accomplish much the same result by digging down on one side of the tap-root 2 feet below the surface and cutting it off cleanly with a sharp knife or pruning shears one year before it is to be dug for permanent planting.

In the North, results are usually best with early spring planting, while in the South planting from December to February is ordinarily the most satisfactory. In the North, nurserymen commonly make a practice of digging the trees in the fall and heeling them in until spring in order to be ready for early shipment. It is, therefore, usually possible to order the trees so that delivery will be made at the precise time they will be wanted for planting.

If prices are high, or trees of a desired variety scarce, planters may purchase one or two each of the desired varieties and a year or two later cut buds or scions from them for use in top-working on other trees. In most cases, it is possible to obtain scions for top-working on trees already owned by the planter, either direct from the owner of the parent tree of the desired variety, or from nurserymen, or others having budded or grafted trees.

HANDLING THE NUTS.

HARVESTING.

Walnuts should be harvested promptly after falling from the trees, the hulls removed soon, and the nuts spread out to dry lest the kernels become discolored and the flavor rank. When promptly attended to in this way, the kernels will be bright colored and the flavor not strong. Ordinarily the nuts drop from the trees voluntarily and the matter of harvesting is merely picking them off the ground.

HULLING.

The hulls may be removed by an ordinary corn-sheller, or, if no better device is at hand, the nuts may be driven through holes with diameters slightly greater than that of the nuts themselves bored in a 2-inch plank. So far as known, no machinery for hulling has yet been devised. Removing the hulls while still green in color may largely prevent the kernels becoming dark colored or strong in flavor. Vigorous scrubbing will cause any black walnut to become white.

CURING.

As soon as hulled, spread the nuts on wire screen or board surfaces in layers, preferably not more than three nuts deep. If indoors or the weather is damp they should be thoroughly stirred daily. When possible, the nuts should be spread out in trays having bottoms of wire mesh and placed well above ground so as to permit free circulation of air below as well as above.

CRACKING.

The usual instrument for cracking black walnuts is the hammer. However, an Illinois grower has improvised a cracking machine which enables the kernels to be extracted much more perfectly than where a hammer is used. It consists of an ordinary blacksmith's vise, within the jaws of which are fixed two plates with shallow cups facing each other so as to fit the nuts. He reports that while this implement is slow of operation and some practice is necessary in order to get the best results, it gives better results than the hammer. Recently two different types of instruments for cracking black walnuts have been announced by manufacturers.

If the nuts have been well cured before cracking and not allowed to become moist again, further shrinkage in weight will not be important; but if not, the kernels should be carefully cured at this time. Otherwise the price will likely be discounted by the mer-

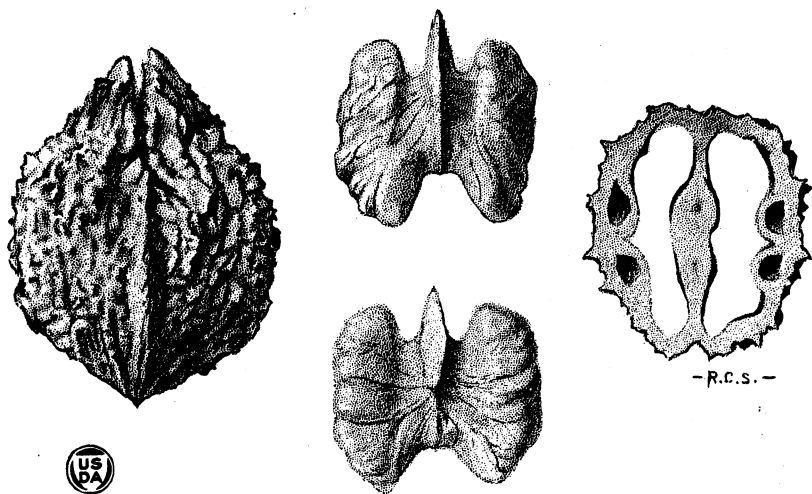


FIG. 14.—Nut and kernels of the Ohio variety of black walnut.

chant so as to take care of his shrinkage and labor cost. Losses from poorly cured kernels are sometimes serious, entire barrels becoming moldy and caking into a nearly solid mass during shipment.

VARIETIES.

The term "variety" is used here in the only sense in which it may properly be applied to cultivated fruits or nuts. It does not refer to seedling trees but only to those which have been budded or grafted. The significance of the term "Thomas," with reference to the black walnut, is relatively the same as that of "Baldwin" with reference to the apple, "Elberta" to the peach, or "Washington Navel" to the orange.

A considerable number of black walnut varieties have been propagated during the past years, although not many are available at any given time. Probably more were available from the nurserymen during the period from 1915 to 1920 than at any other one time.

Fewer varieties are being propagated now than then, not wholly because of proven superiority of some over others but partly because of the cost of producing the trees in the nursery and the consequent high prices charged by the nurserymen, partly because of the hesitancy of many agriculturists in taking up new lines—particularly when the product is one right at home, and partly because of established records of production and profit.

The following varieties are among those now most favorably regarded of any available. A majority of these show a tendency to begin fruiting at very early ages.

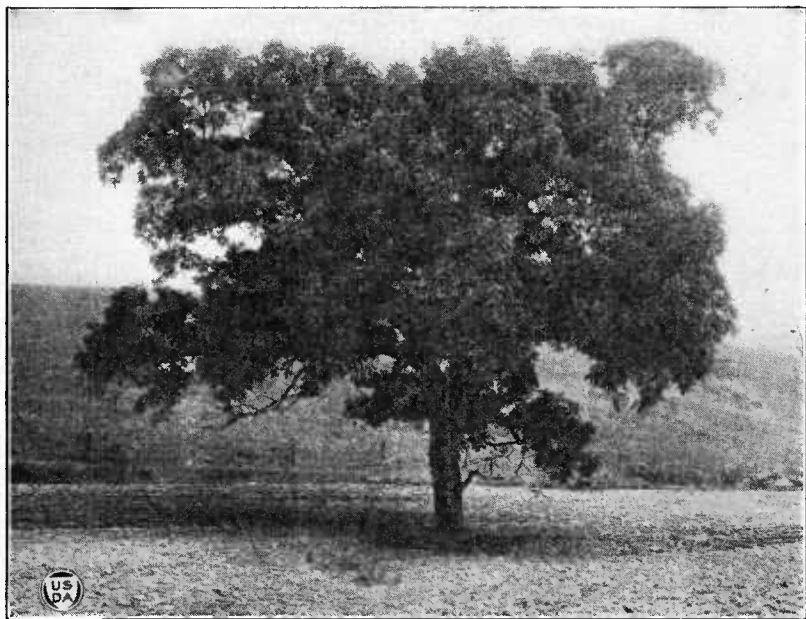


FIG. 15.—Parent tree of the Stabler variety of black walnut, growing in Howard County, Md.

McCOY.

From near Lake, Spencer County, Ind., some 15 or 20 miles from the Ohio River. Discovered in 1917 by R. L. McCoy, then of that address. Propagated comparatively little. Not regarded as favorably as some others because of low cracking quality.

MILLER.

Another variety from southern Indiana regarded favorably for a time but now propagated very little. Cracking quality not good.

OHIO.

One of the better known and most favorably regarded varieties. From a tree near McCutcheonville, Ohio, discovered by Luther G. Haines, formerly a resident of that place. It was first propagated in 1916 by J. F. Jones, Lancaster, Pa., and has since been quite widely disseminated. The parent tree has been a vigorous grower

and heavy bearer. The nuts are large, somewhat flattened on the sides, and usually pointed at the apical end. The shells are rather thick but vary considerably from year to year in this respect, as do those of many other varieties. Very often the kernels may be extracted as perfect halves (fig. 14).

PEANUT.

An Ohio variety, so named because of the fact that a high percentage of the kernels formed as single solid pieces. It was disseminated to a considerable extent during the middle nineties for test purposes, but so far as known to the writers that characteristic, for which it was named, has not appeared in the nuts of any grafted trees. Such nuts of this variety as have been produced by grafted trees have not appeared to advantage.

STABLER.

From a farm in Howard County, Md., owned by Priebe Bros. It was discovered in 1916 by Henry Stabler, of Sandy Spring, Md., after whom it was named by T. P. Littlepage, of Washington, D. C. Since its introduction, this variety has been more widely disseminated than any other during the same period. It is regarded as being

one of the most promising of any known variety. The yield from the parent tree, shown in Figure 15, is stated by A. W. Priebe to have been between 11 and 12 bushels of hulled nuts in 1916. So far as known to him, this has been the maximum yield.

Like nuts of many other varieties, those of the Stabler vary from year to year. They are also variable during the same year, as shown in Figure 16. The shell is invariably thin, and, very often, by exercising some care, the kernel may be extracted without separating

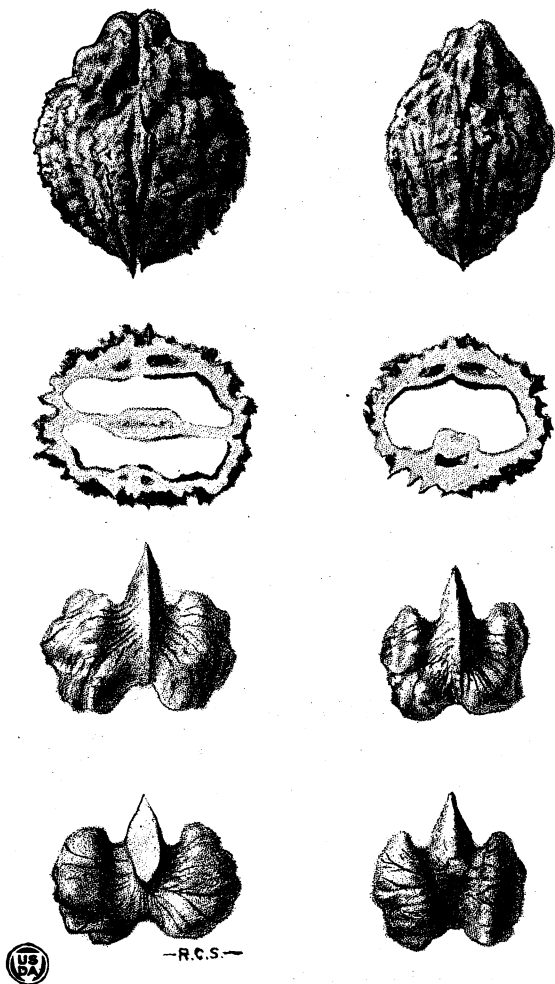


FIG. 16.—The Stabler black walnut showing extremes of type. In some nuts the kernel consists of two normally developed halves; in others one-half is but partially developed, while in still others the kernel forms as a single solid piece.

the halves or injuring either. The form of the kernel ranges from two full halves to single solid pieces. Usually the latter are the more plump and more easily extracted. In form, the nuts greatly resemble the Ohio, but are smaller, thinner-shelled, and much more easily cracked. The flavor of the kernels is rich and pleasing, but regarded by some as a trifle strong.

THOMAS.

This variety is doubtless represented by more old bearing trees in various places throughout the country than any other. It was called to public attention during the early nineties, by J. W. Thomas & Sons, King of Prussia post office, Pa. For more than a decade it was the only variety of black walnut to be propagated or disseminated to any extent. Many planters still regard it as among the leading varieties. The nuts are of medium to large size, considerably

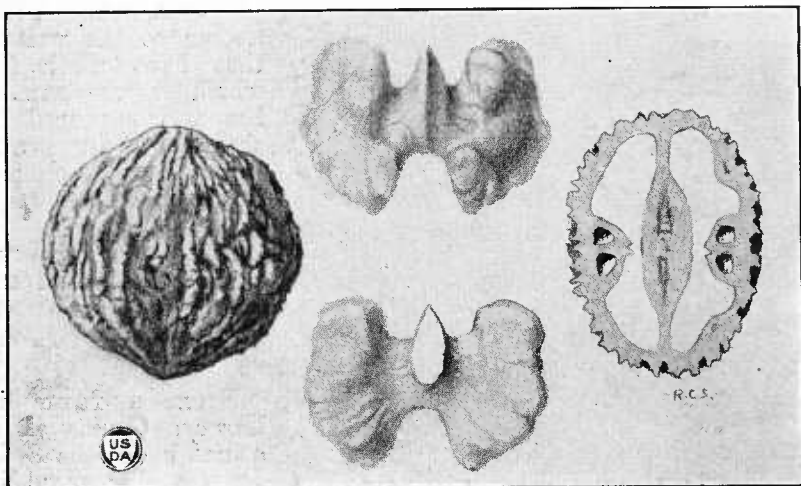


FIG. 17.—Black walnut of the Thomas variety. (Reduced in size.)

wider than thick, fairly thin-shelled, and much superior to average black walnuts in cracking qualities. The kernels are usually plump, light colored, and of pleasing flavor. The nuts are illustrated in Figure 17.

SOURCES OF INFORMATION AND PLANTING STOCK.

For further information on the growing of black walnut for timber, and for lists of dealers handling seeds or seedling trees, apply to your State forester or to the Forest Service, United States Department of Agriculture, Washington, D. C. A number of State foresters are growing 1 and 2 year-old seedlings of various tree species suitable for their respective States and furnishing them free or at the cost of production.

For further information regarding the growing of black walnut trees primarily for nuts, apply to the Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C.